
Laparoscopic Treatment of Uterine Myomas

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The treatment of leiomyomas of the uterus has traditionally been by laparotomy. Newer endoscopic instruments are enabling gynecologists to treat these common tumors with minimally invasive surgery, resulting in same day or overnight hospitalization and much shorter recovery times. The laparoscope is one of the endoscopic instruments that is allowing the to occur.

Leiomyomas of the uterus are one of the most common tumors of the uterus, estimated to occur in 20% to 25% of women of reproductive age. A myoma is a benign smooth muscle tumor that occurs as a discrete elliptically spheroid pseudoencapsulated mass in and around the uterus. Various names have been given to these tumors such as fibroids, fibromyomas, leiomyomas, myomas, and in the Negro population that has the highest incidence, "fire balls." The location of the leiomyoma determines its classification. They all start off as intramural or within the walls of the uterus. As they enlarge most stay within the walls and remain intramural. Others will grow towards the surface and bulge above the serosa to varying degrees and become known as subserosal. Still others will grow towards the endometrium and bulge into the endometrial cavity and become known as submucosal. Subtypes of the subserous and submucosal are called by their location - pedunculated (attached by a stalk), intraligamentous (between the leaves of the broad ligament), parasitic (completely detached from the uterus), and fibroid

polyp (on a stalk protruding thru the cervix). They can also develop in the cervix and be known as cervical myomas. These tumors vary considerably in size from a few millimeters to 50 pounds and grow at equally varying rates. This growth is estrogen dependent so they are rarely found before menarche and rarely develop or enlarge postmenopausally. Rapid growth can occur during pregnancy.¹

The majority of uterine myomas are asymptomatic and are only noted on routine pelvic examinations. The symptoms that do occur fall into four areas. The increasing size of the tumors may cause pelvic pressure or heaviness, abdominal enlargement, or urinary frequency. Pain may be caused by rapid growth and degeneration or by torsion of a pedunculated myoma. Excessively heavy bleeding is caused by the submucus variety. Infertility may stem from blockage of the fallopian tubes, repeated abortions from the submucus type, endometrial changes preventing implantation, or possible biochemical changes interfering with sperm transport. Sarcomatous degeneration rarely occurs somewhere in the order of less than 0.1% of women with leiomyomas.²

The diagnosis of uterine myomas is usually made on bimanual pelvic examination and confirmed with pelvic ultrasound, although CT and MRI can do the same but at higher cost. The main thing to be ruled out is an adnexal mass, especially an ovarian carcinoma. Once the diagnosis is definitively made the patient is educated about leiomyomas. Then comes the question of management. There are no known preventive measures for these tumors and no long term medical therapies. Because the majority are asymptomatic, the keynote to management is prudent observation with pelvic examinations and sometimes ultrasound between 3 and 12 months apart. If treatment is needed, short term medical therapies are available as well as various surgical procedures. The factors that need to be considered in determining treatment are location and size of the myomas, coexisting pathology, symptoms of the patient, her age and reproductive status, and lastly her desires. A suggested workup of the patient would include a careful ultrasound mapping of the locations and sizes of the fibroids, doppler examination of the blood supply, a hematocrit and hemoglobin, a biopsy of the endometrium and possibly a bone density.³

Prior to the development of endoscopic surgery including operative laparoscopy and hysteroscopy, patients with symptomatic leiomyomas were treated by hysterectomy, usually abdominally and sometimes vaginally. Hysterectomy is the second most common operation in the United States. In 1985 of the 97 million women over the age of 15 years, approximately 18.5 million had undergone a hysterectomy. On occasion a transabdominal myomectomy was done to relieve symptoms but preserve fertility or because the woman desired to retain her uterus. These are major surgical procedures requiring postoperative stays of 3 to 6 days and 4 to 8 weeks

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total recovery time. Because of the mortality and morbidity associated with major surgical procedures, any operation that will relieve the symptoms of fibroids while avoiding major surgery deserves consideration.² With the recent advent of operative endoscopic surgery more options are available to both the physician and the patient. Among the choices available now are laparoscopic assisted vaginal hysterectomy and its various modifications, laparoscopic myomectomy using electrosurgery, lasers or harmonic scalpels, laparoscopic myolysis using lasers, bipolar needles with electrical current, hyperthermia electrodes (diathermy),¹⁰ or hypothermia probes (cryomyolysis), and hysteroscopic resection or vaporization of submucous myomas.⁹ The laparoscopic assisted vaginal hysterectomy will be discussed in another section of this issue. I only need to mention here that it can convert an abdominal hysterectomy to a vaginal one with a shorter hospital stay and shorter overall recovery time. The other procedures are done on an outpatient basis with no hospital stay and even shorter recovery times. Three things seem to be driving the use of these newer procedures. One is technologic advances with a myriad of endoscopic instruments, improved scopes and video systems and high flow insufflation systems. Another is the push from managed care to lower costs. Lastly there has developed a feeling among some women to have lesser procedures done to them than the traditional hysterectomy. Some of this comes from not wanting to go through a long recovery period but also from not wanting to lose part of their femininity.⁴

Myomectomy done through an abdominal incision has always been considered to be a more difficult and morbid procedure than an abdominal hysterectomy. Doing the myomectomy through a laparoscope is even more difficult and requires much greater surgical skill. The choice of doing an abdominal or laparoscopic myomectomy depends on the surgeon's skill and experience. The difficulties involve removing the myoma from the uterus without losing much blood, suturing the defect in the uterine wall, then removing the myoma which may be 2 to 6 cm in diameter from the abdomen where the largest incision is a 1-2 cm. This procedure can be likened to making an incision in the skin of an orange and removing the central portion (the myoma). The hole that is left needs to be closed with a series of sutures so that there is no remaining defect and the surface of the orange is smooth again. The central portion is then morcellated or cut into chip size pieces for removal. If this can be accomplished, it allows the patient to be discharged on the same day of surgery and usually back to work within a week or two.⁵⁻⁸

Because of the technical difficulties with the myomectomy, the technique of laparoscopic myoma coagulation or myolysis was developed first in Germany in 1986 and started in the United States in 1990. It involves destroying the stroma and blood supply of the myoma using the a variety of instruments. The first to be used was a Nd:YAG laser. This procedure succeeded in shrinking the myomas but with a high incidence of postoperative adhesions.¹² The second and currently the most widely used instrument is a bipolar needle which is a 2-pronged 5 cm long needle that is attached to an electrical generator that supplies 70 to 120 watts of continuous power. The needle is inserted into the myoma by perforating it at 10 mm. incements accross the serosal surface, extending to the base of the myoma forming parallel cylinders of dessicated denatured tissue. When feasible the myoma is perforated in perpendicular planes to destroy the stroma and its vasculature more completely. A

modification of this technique is to circumferentially perforate the base at 5 mm. intervals to destroy the blood supply to the myoma as much as possible while minimizing thermal damage to the serosal surface. The coagulating effect of this procedure devascularizes the myoma resulting in shrinkage of between 60 to 80 % of the original size. The patient is usually pretreated with a GnRH agonist such as depo Lupron monthly for 3 to 4 months. This synthetic pituitary hormone decreases circulating estrogens which in turn decreases the size of the myomas preoperatively by an average of 38% and the overall uterine size by 30% to 50%. This hormone does two things. First it makes the laparoscopic procedure easier if shrinkage does occur and secondly it eliminates myolysis as an option if shrinkage does not occur. This is because long term shrinkage is less likely after myolysis with these non responsive myomas and it virtually rules out the rare leiomyosarcoma that is not estrogen dependent. For women with submucous myomas the myolysis procedure can be combined with operative hysteroscopy to remove this type of myoma. The myoma in this case is shaved into chips or vaporized much as in a transurethral prostate resection. Success rates with these procedures in eliminating symptoms are reported at better than 90%. Currently myolysis shows great promise in reducing the need for hysterectomies for myomas especially in perimenopausal women. It appears to be a safe effective alternative to hysterectomy by avoiding major surgery and having a shorter recovery time.¹¹

This area of laparoscopic surgery for myomas is constantly evolving. Other techniques of coagulation are being investigated as well as testing which are the most effective. The use of color doppler ultrasound to determine where the feeding vessels are located as well as its use intraoperatively to evaluate vascular destruction during coagulation are also being studied. There is also one investigator who is exploring cryotherapy to devascularize the myomas.

As was stated earlier in this paper the push to develop alternatives to abdominal hysterectomy for uterine myomas has opened up a wide array of choices for both physician and patient. The future will probably bring in not only other laparoscopic technologies but other areas as well such as interventional radiologists obliterating the vascular supply of the myomas or long term medical therapies for these common tumors of women.

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